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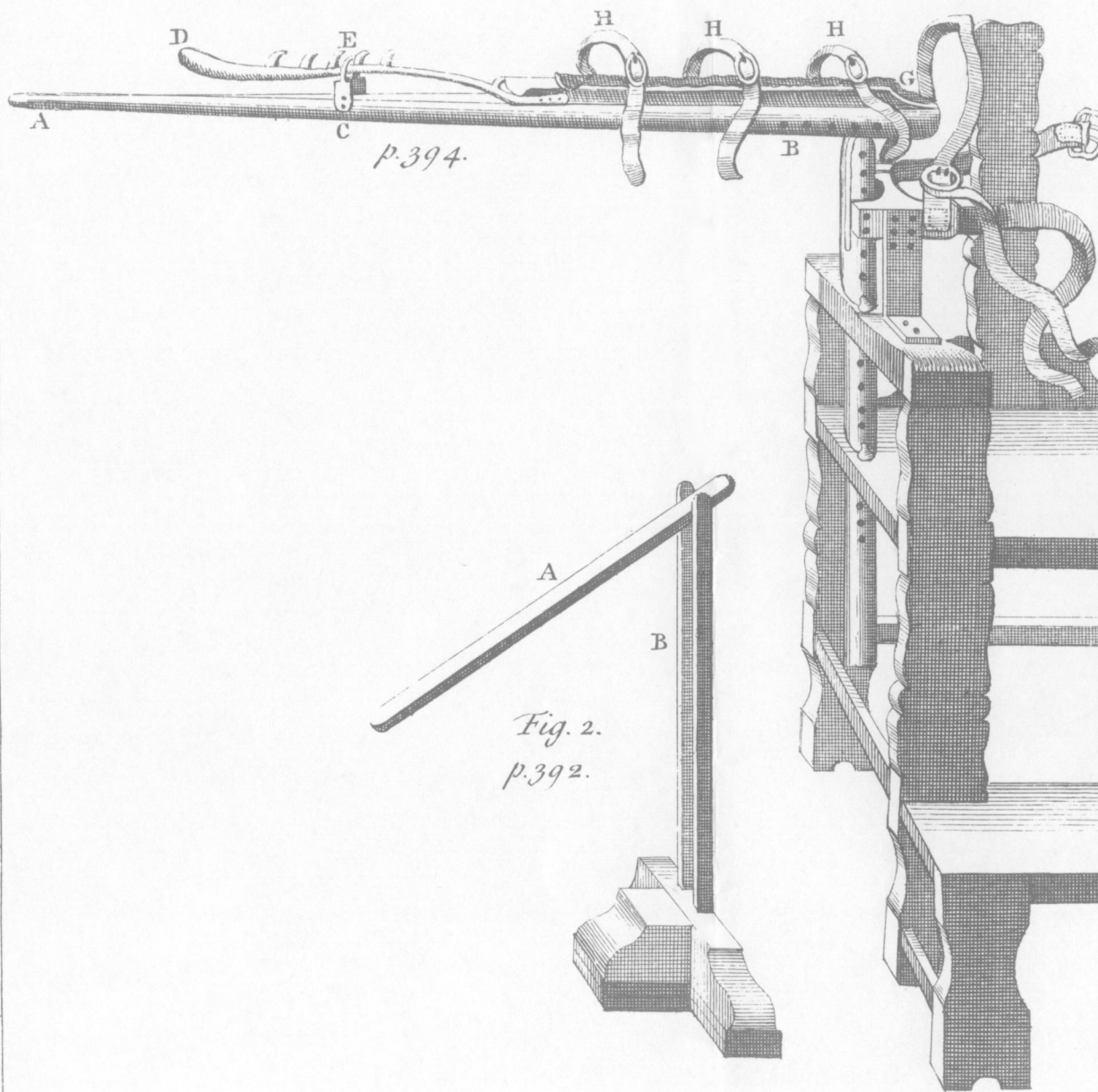
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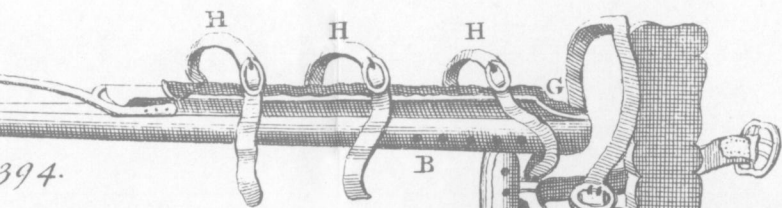
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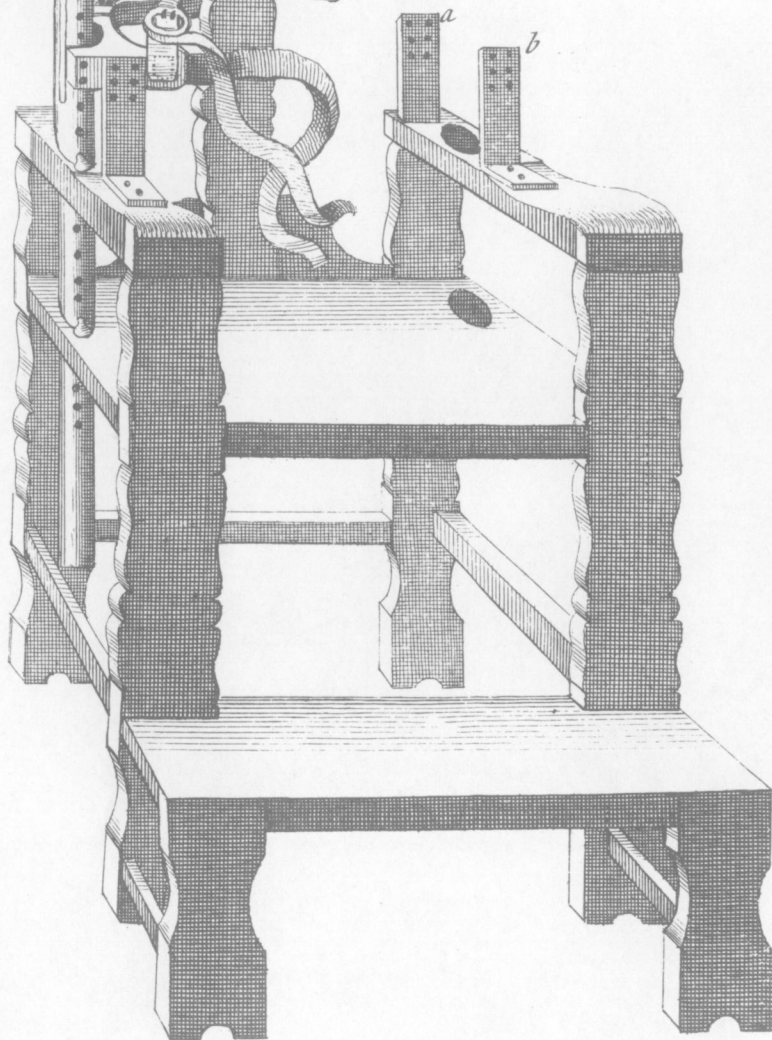
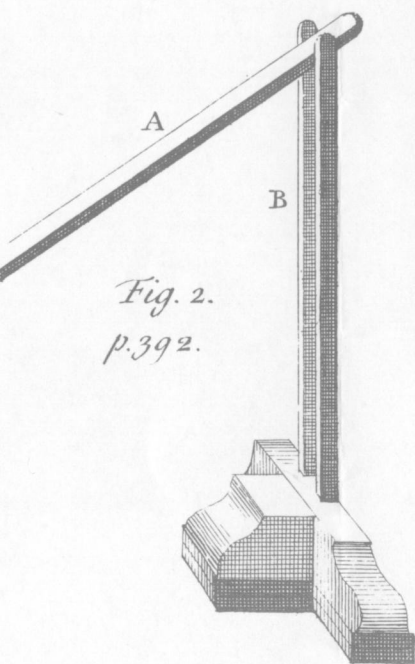
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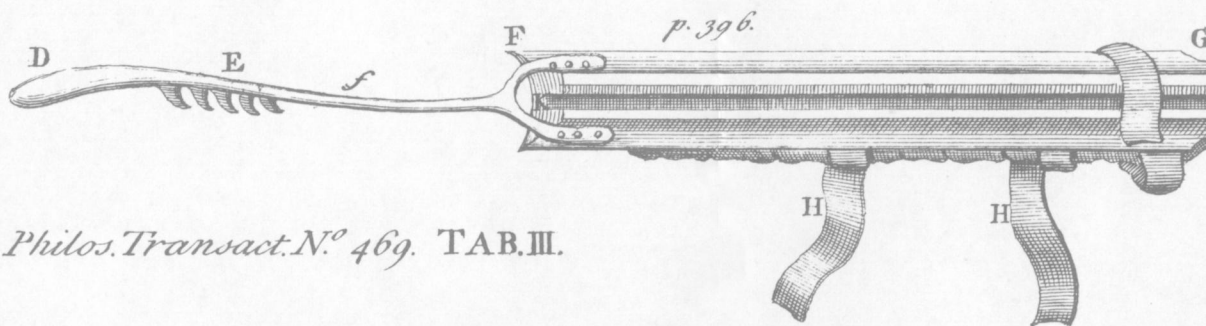
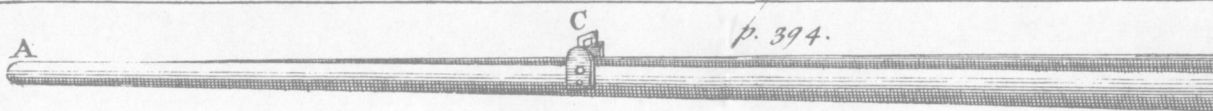
A Scale of Feet to be measured upon the fore part of the



394.

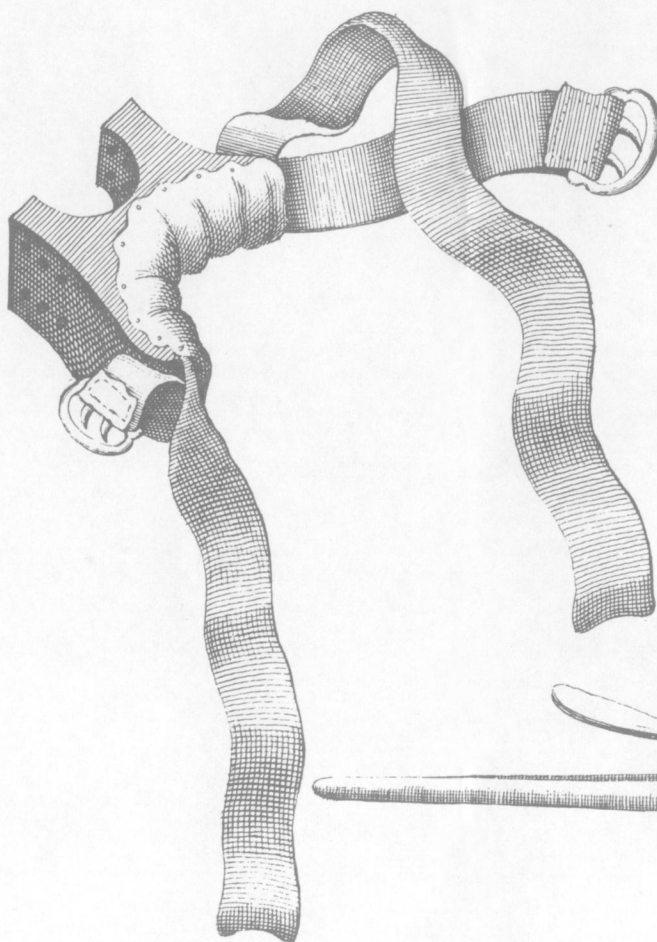


of Feet to be measured upon the fore part of the Figure.

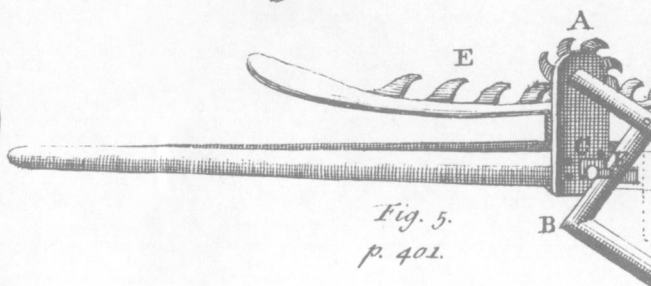


Philos. Transact. N.^o 469. TAB. III.

*Fig. 1.
p 392*



*Fig. 5.
p. 401.*



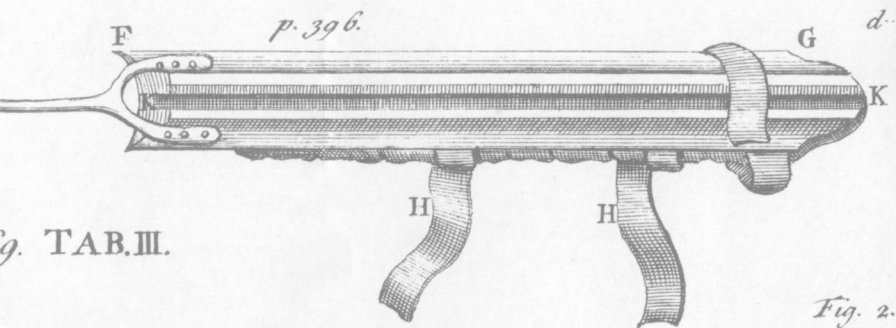
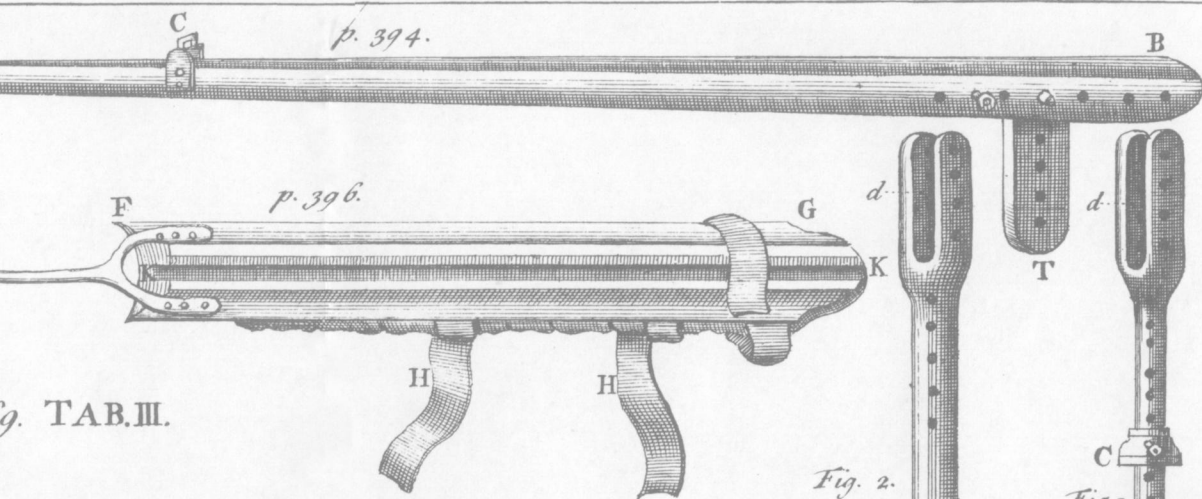


Fig. 2.
p. 393.

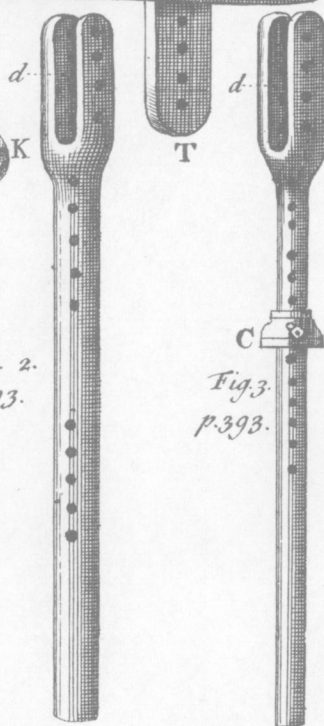


Fig. 3.
p. 393.

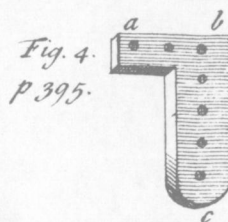
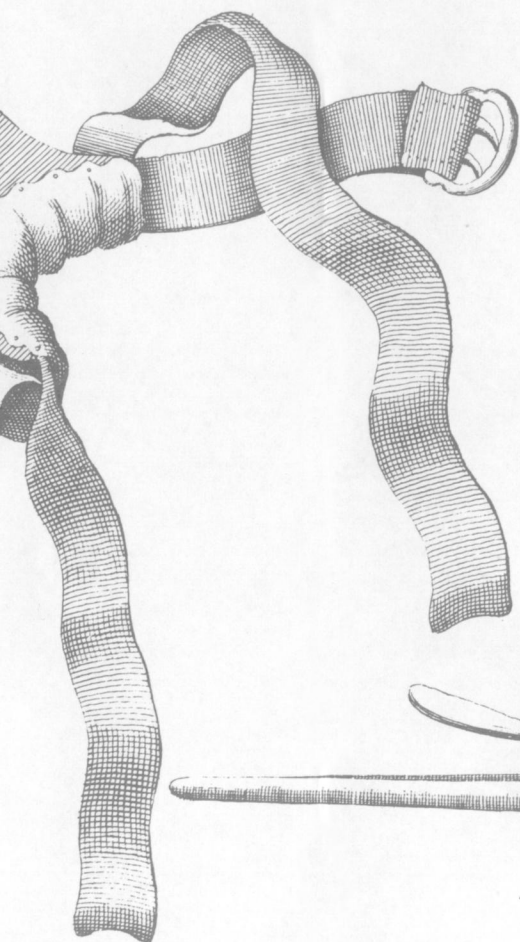


Fig. 4.
p. 395.

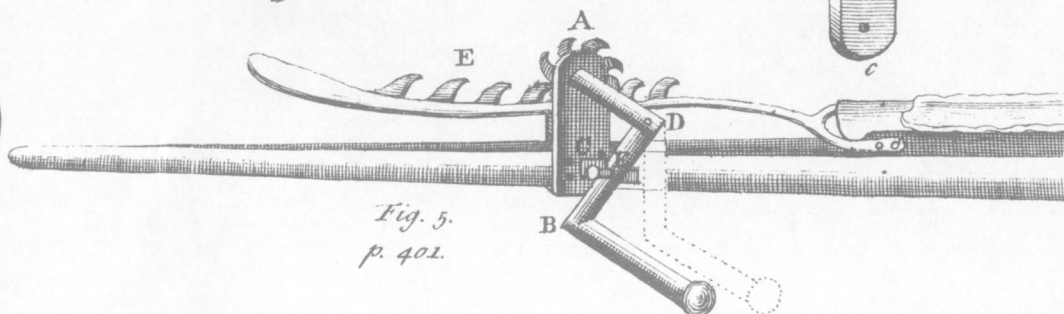
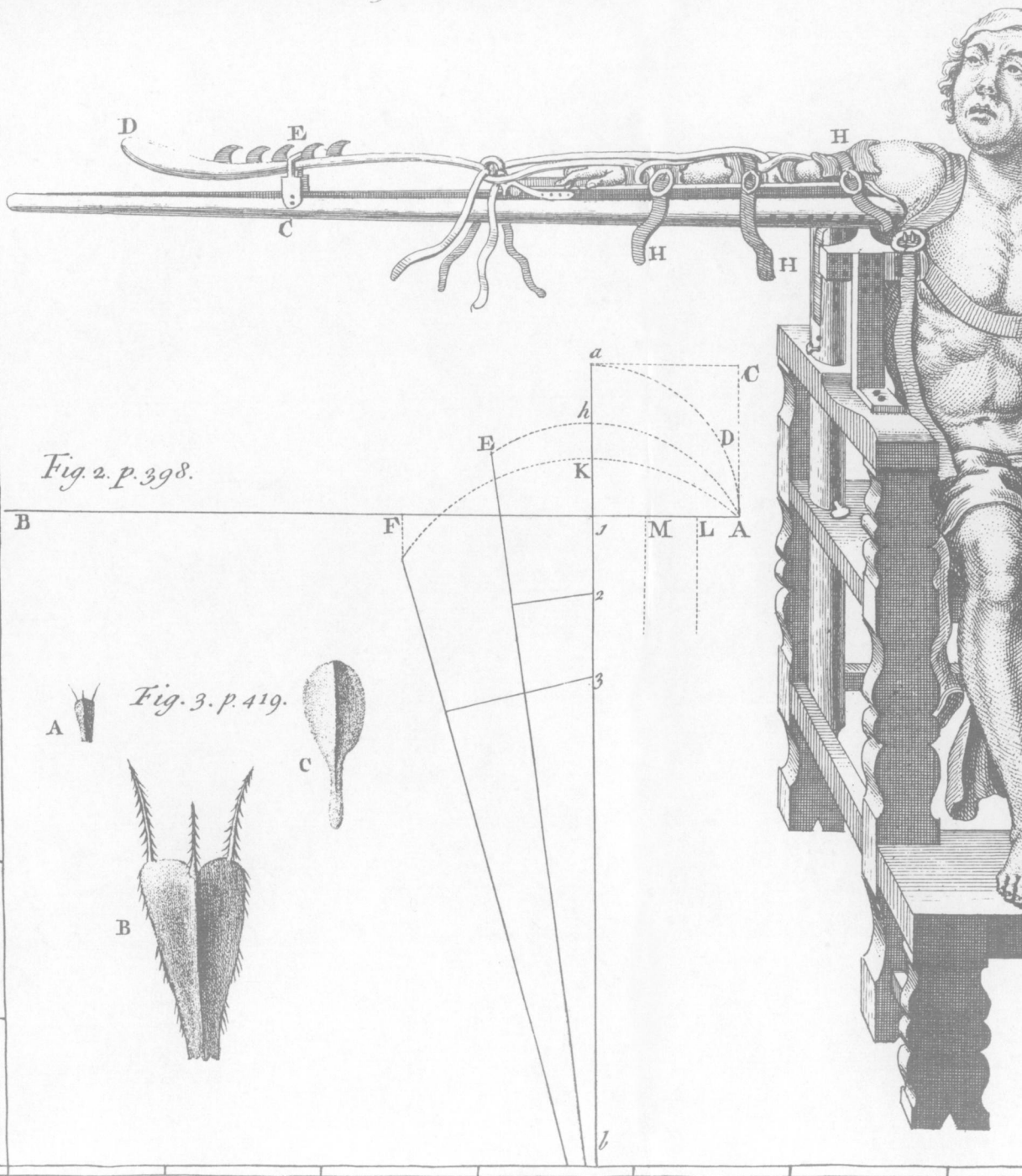


Fig. 5.
p. 401.



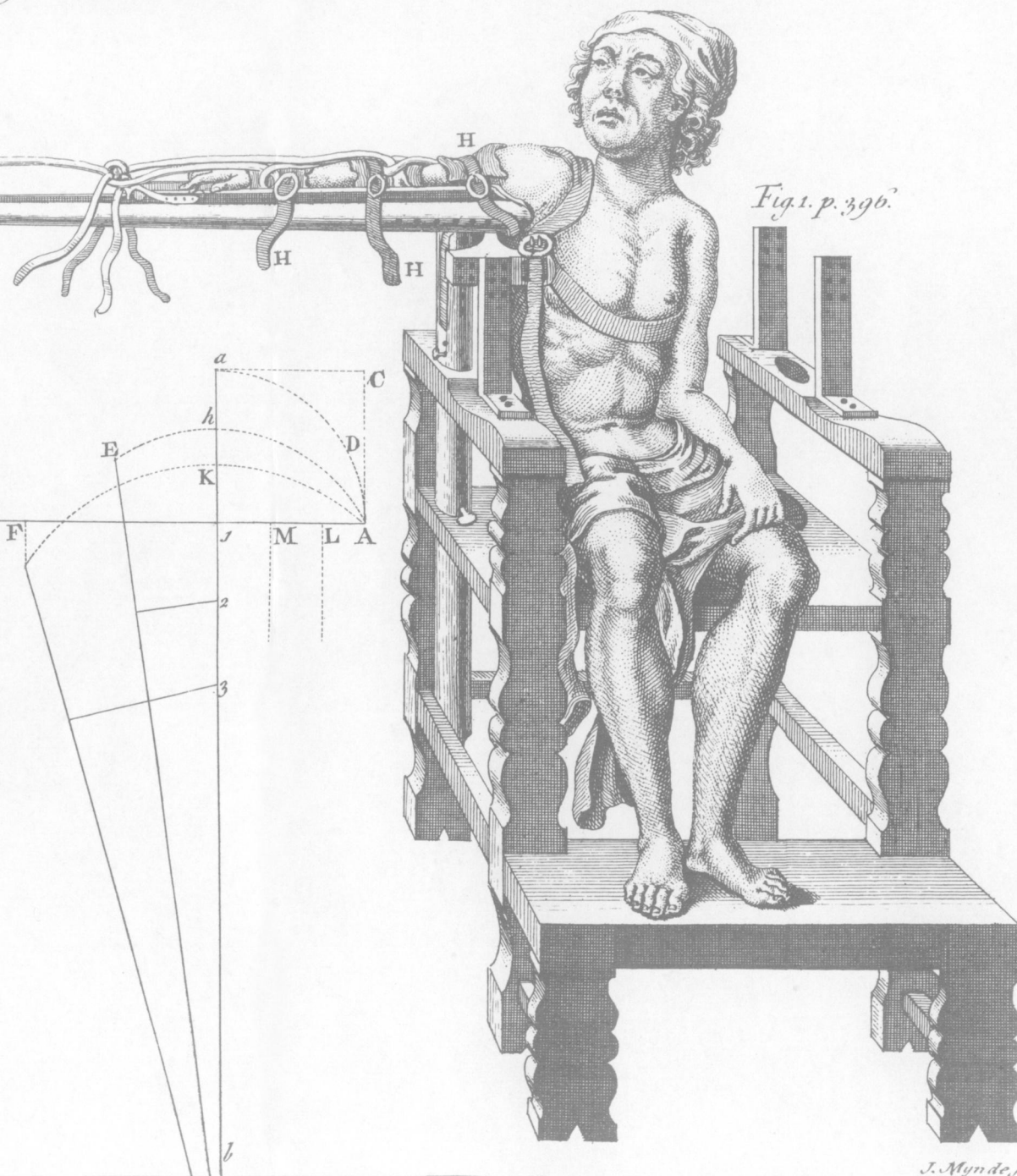


Fig. 1. p. 396.

II. *The Ambe of Hippocrates for reducing Luxations of the Arm with the Shoulder, rectified; by M. le Cat, M. D. F. R. S. Surgeon to the Hôtel Dieu at Rouen, and Royal Demonstrator in Anatomy and Surgery: Extracted from the French by P. H. Z. F. R. S.*

Read Feb. 17.
1742-3.

THIS is one of those Chirurgical Operations which has many times puzzled the most skilful Surgeon. Among the Machines which Art has invented for the performing of it, *the Ambe of Hippocrates* is one of the most antient and most famous.

It is known to consist of an horizontal Lever *A*, and of a fixed Point *B*. (TAB. II. Fig. 2.) made of a Piece of Wood standing vertically, to the Extremity of which the Lever is joined by a Hinge. The Patient sitting, and his Arm, that is hurt, being raised, the Machine is pushed forward under the Arm-pit, so that the vertical Piece of Wood is applied along the Ribs, where the Lever enters into the Arm-pit up to the End of the luxated Bone, or even farther. This Circumstance is essential, and even recommended by *Hippocrates*: *Imprimis vero, says he, id elaborandum est, ut ligni summa pars, brachii capite superato quam penitissime alam subeat.* Sect. VI. p. 783. *Fæsi*. The Arm is tied to this horizontal Piece, and then an Assistant bears upon the *Scapula* and the *Clavicula*, as is seen in the Figures of *Sculptetus*, Plate 21. whilst

whilst another presses down the Lever, and thus makes the Bone come into its Place again.

Hippocrates, giving the Description of this Invention, and of its Use, acknowledges that this Method of reducing the Luxations of the Arm is incomparably better than all the others; for, says he, the working of it is sufficiently powerful; and provided Care be taken to push the Lever farther on under the Arm-pit than where the Bone of the Arm lies, the Extensions and Counter-extensions are equal, and the Bone of the Arm is safe: He adds, That by this Method fresh Luxations are reduced sooner than one thinks, and even before the Extension appears to have been made; and that, as for old Luxations, they can only be reduced by this Method; unless, by their being too old, the Cavity of the Articulation be filled up, and that the Head of the Bone has formed to itself an Articulation in the Place where it fell: He even believes, that such a Luxation may be reduced; for, says he, What is there that cannot be moved by sufficient Forces? But at the same time he thinks that the reduced Bone will not remain in its Place, but luxate itself again, and fall back into the new-formed Articulation, which it has formed to itself.

(Here follow Hippocrates's Words in Latin.)

“ Hæc reponendi humeri ratio longe optima censetur. Justissimam enim molitionem facit, si vel
 “ solum intro magis quàm brachii caput lignum
 “ immittatur, justissimæque fiunt in utramque partem
 “ librationes, & ossi brachii securitatem præstant.
 “ Recentia igitur opinione citius reconduntur, ac
 “ pri-

“ priusquam extensio facta videatur. Quinetiam ubi
 “ inveteraverint, hæc sola repositio restituere potest,
 “ nisi jam temporis lapsu caro quidem articuli cavi-
 “ tatem occupaverit, & brachii caput locum in quem
 “ declinavit, consuetudine tritum jam sibi fecerit;
 “ enimvero tamen ita inveteratum brachii luxum
 “ reponere mihi posse videtur. Quid non enim iusta
 “ molitio moveat? Non tamen loco manere posse
 “ existimo, sed, ut consuevit, prolapsurum.” *Loco
 citato.*

One of the greatest Surgeons of our Age (M. *Petit*) in his Treatise of the Diseases of the Bones, was sensible of all the Perfections of the *Ambe* of *Hippocrates*: He acknowledges with that Father of Surgery, that this Machine has a *sufficient Force*, and is more than sufficient——that it makes an *Extension* and a *Counter-extension* equally strong——He even adds——that *the Arm is placed there as it ought to be, in order to relax the Muscles*, or at least *stretch them equally*, which is the Fourth Rule the Author proposes to be observed, *p. 42.* in making the Extension and Counter-extension. But at the same time M. *Petit* does not dissemble some essential Defects he finds in this Invention, and which, without doubt, were unknown to *Hippocrates*.

The capital Defect in this *Ambe* is, that *it pushes the Head of the Bone into its Cavity, before the Extension and Counter-extension are made.* The dangerous Consequences of this Defect, are, according to M. *Petit*, 1st, That the Reduction is very difficult, because the Bone is not conducted by the same Way it took in luxating itself, and that one meets with Obstacles from the Parts that surround it,
 even

even the *Scapula* itself, on which it articulates. 2dly, In making those Efforts for surmounting those Obstacles, one runs the Risque of turning inwards the cartilaginous Edge of the Cavity of the *Scapula*, or the *Capsula ligamentosa*. The Second Defect of the *Ambe* of *Hippocrates* is, that it cannot move the luxated Bone but from below upwards; consequently, this Machine is only proper in Luxations directly downwards; and yet it is certain, that the Arm luxates itself both outwards and inwards; and even it is known to all Practitioners, that Luxations forward are very frequent. Here you have a great Number of Luxations of the Arm, where the *Ambe* becomes useless: Now, if the *Ambe* of *Hippocrates* is useless in all Luxations outwards, and in Luxations inwards, which are very frequent, if it is dangerous in Luxations downwards, the only ones it is fit for, one must own, that this Machine, so much cried up by *Hippocrates*, is yet very imperfect.

These Imperfections are real ones, but the Advantages, which one cannot but own it has, are so constant, and so superior to those of any other Practice, that one naturally inclines not to part with it, but becomes desirous to remove those Defects it has, without which it would certainly be, as *Hippocrates* assures, the most perfect of all Machines made use of in reducing a luxated Arm: For supposing an *Ambe*, which makes a sufficient *Extension* and *Counter-extension*, before it leads the Bone into the Cavity, or at the same time it does so, and which also might lead it from the Right to the Left, and from the Left to the Right, as well as from below upwards, it is certain there can be no Method to be compared to this;

this; because there is none in which concur at once so much Force and Expedition, joined to such Simplicity, Regularity, and Safety, that are quite singular. For that Method in which a Surgeon only employs his own Strength, and that of his Assistants, is commonly insufficient; and the other, in which he helps himself with the Pulley, is perplexed with a great *Apparatus*, is long, and still very much wants the Hands of the Surgeon, and of his Assistants: All which are Circumstances which render the Method more complicated, and less sure.

These are the Motives that have engaged me to contrive the new *Ambe* I herewith have the Honour to lay before the SOCIETY, in which I have endeavoured to rectify all the Defects before-mentioned.

A Description of the new Ambe.

TAB. II. The Basis of the whole Machine is an Elbow-chair all of solid Wood, higher than others usually are, in order to give Room to the Lever to play the more freely, which cannot be lowered any farther than to the Floor on which the Elbow-chair stands: To prevent any Uneasiness to the Patient from that Height of the Chair, it has a Foot-stool that makes Part of the Chair, and brings the Seat to its usual Height.

Each Arm of the Chair is pierced with a round Hole, to receive the *Stem* or *Foot* of the *Ambe*. If the Luxation is on the Right Side, the Foot is run through on the same Side, and *vice versa*. The Patient is tied partly to the Back of the Chair, partly to a Piece joined to the Chair on that Side where

the *Ambe* is placed. This solid Union of all the Pieces of the Machine between themselves, and with regard to the Patient, furnish its Action with all the Force and Certainty possible. The *Ambe* of *Hippocrates* can play but to a small Extent: It is separate from the Chair in which the Patient sits, and he is left to the Care of the Assistants; all disadvantageous Circumstances, which are remedied by my Machine.

In that of *Hippocrates*, the Body of the Patient has no other Support against the Extension of the Lever than the very vertical Piece (see TAB. II. Fig. 2. *B.*) on which the Lever rests; this Piece is narrow, has no Proportion, or, if one may say so, no Union with the Figure of the Body to which it is applied, and consequently must change his Position on that Piece upon the least Effort the Patient makes.

The Foot of my Lever has no Connexion with the Patient's Body: There is between the Foot and his Body a particular Piece which I call *the Bodice*, represented in Fig. 1. TAB. III. One will see there, that it is made to fit itself to the Body; and, in order to render that Application easy, that Part which touches the Body, is quilted. This Bodice is fixed to the Arm of the Chair between Two large Iron Cheeks, *a, b*, Fig. 1. TAB. II. by Two strong Iron Pins, which run through them, and are stopped at their Extremities with Nutskrewed on. The concave Part of this Piece, where the Body enters, is placed perpendicularly under the End of the Lever, however so that the Lever be a little farther advanced towards the Patient, than the Bottom of the Bodice, to the end that the Lever may thrust itself the better in under the Arm-pit. As there are Cases where the Head of the Lever ought
to

to be very short, or very near the Point it rests upon, and others again on the contrary, where that Extremity of the Lever ought to be longer, and farther off the Point of its Rest, the Bodice of course ought to be set backwarder or forwarder, as the End of the Lever is, the Direction of which it follows every-where. For this Reason we have contrived Two Rows of Holes along the Sides of the Bodice, and between these Two Sides we got a Notch cut out, to make room not only for the Foot, or for the Point it rests upon, which may meet there, but also for a Part of the Lever, which I call its Spur, which always moves towards that Notch when the Lever is lowered. The Figures and the Use of the Machine will shew the Necessity of this Construction much better than any Description. From the said Bodice come out Two broad Straps of the strongest Leather with their Buckles. One of those Straps is to go about the Back of the Chair, and round the Body of the Patient; the other goes over the Shoulder, very near the Articulation, and keeps the *Scapula* and the *Clavicula* in their Situation against the Efforts of the Lever; see TAB. II. and IV.

That Part of my Machine, that may be called the *Ambe* properly said, is composed, like that of *Hippocrates*, of Two Pieces; one vertical, which I call the Foot of the *Ambe*; and the other horizontal, which forms the Lever. It is chiefly in these Two Pieces that my *Ambe* differs from that of *Hippocrates*.

The Foot is a Piece made either of Wood, TAB. III. Fig. 2. or of Iron, Fig. 3. Its upper Extremity is split into a sort of Mortise, which receives the Spur

or Tenant *T* of the Lever *A, B*. It is pierced by several Holes, which answer to as many others on the Spur. Below this Mortise the Foot becomes more slender and cylindrical; by this Part it enters into a round Hole in the Arm of the Chair; this slender Part of the Foot is pierced by several Holes, in order to run an Iron Pin through, which lies flat on the Arm of the Chair, and keeps the Foot raised to a Height proper for the Person that undergoes the Operation: For the greater Security one may run Two Pins through; one which rests upon the Arm of the Chair, and the other on the Seat itself, through which the Foot passes also. The Iron Foot, Fig. 3. may be provided with a sort of large Ring *C*, under the Pin, which will render its Rotation the easier. If one should prefer an Iron Foot, one may easily judge, that the Hole for it in the Arm of the Chair must be made narrower, either by filling up the old one with an Iron Box or Clout, which may be taken away, if one will use a wooden Foot; or one may even at first fit those Holes for the Iron Foot, setting the wooden one quite aside.

The Lever *A, B, H, B*, TAB. II. Fig. 1. is the most compound Piece of all, and withal the most important. It is made of a real Lever *A, B*, and of a Piece fitted to it *D, G*, TAB. II. and III. The Lever properly so called *A, B*, TAB. II. is made round on its inferior Surface; the upper Surface is flat, and all along on the Middle of it there runs a Rod, forked at the End, which fits to a Groove of the same Figure in the inferior Surface of the Sliding-piece *F, G*, TAB. III. This Lever grows less and less towards the Extremity *A*, where the moving Power is to be applied; the other Extremity,
B,

B, is somewhat rounded off at its End, in order to insinuate itself the better under the Arm pit. On this bigger Extremity is a sort of *Spur* or *Tenant*, *T*, TAB. III. the upper Part of which is joined to the Lever by Two Iron Pins, so that, upon taking out the Pins, the Spur comes out, and separates itself from the Lever, as appears by Fig. 4. TAB. III. It was necessary to make this Spur moveable, and give it the Figure of a square Rule in which it appears, in order to bring it quite close to the End of the Lever, or set it back, according as it may be necessary. For this Reason the upper Part of this Spur *a, b*, slides along in a Mortise or Groove of the Length of one Foot contrived under the Lever, beginning from its Extremity *B*, to which answers the Shoulder *b*, of the Spur.

The rest of the Tenant, or its principal Part *c*, is fitted to enter into the Mortise *d*, which is the uppermost Part of the Foot, Fig. 2, 3. TAB. III. They are both of them pierced with a Row of Holes, through one of which one must run an Iron Pin, to unite them, and to form the Point of Rest, or the Hinge of the Lever. Towards the other Extremity *A* of the Lever, there is a Piece of Iron *C*, made Arch-wise, under which passes the elastic Tail *D, f*, of the Rod fastened to the Sliding-piece *F, G*, and into which catch Teeth made on the said Tail, as is seen in TAB. III. and IV. This Iron Arch ought to be very solid, because it keeps down the Arm, and supports all the Effort of the Lever. I will give to the Sliding-piece *F, G*, which is fitted to the Lever, the Name of the *Bracer*; it is a Groove made of one Piece of Wood, represented in its Situation in TAB. II. and IV. This Piece is hollow in the upper Surface, as is just now said, to
place

place the luxated Arm into; this Cavity is quilted, and has Three Girts *H*, with Buckles, to tie the Arm fast and conveniently; they are made of strong Leather. It has on its inferior Surface a Groove with a Dove-tail *K, K*, TAB. III. to lay hold of the Rod of the Lever, and to slide in it without being separated from it, unless it be in sliding beyond the Extremity *B*, of the Lever, where it pulls out like a Drawer, which is easily done, if the *Bracer* has nothing to stop it upon the Lever. The Extremity of the *Bracer*, which answers to the thick End of the Lever, is rounded, in order to enter jointly with it under the Arm-pit; the other gives hold to the Piece of Iron *D, E*, which I called above by the Name of *the elastic Tail of the Bracer*. This latter consists of Four Parts; the Fork *F*, which attaches itself to the inferior lateral Surfaces of the Bracer; the Spring *f*, which is the Piece that follows next, the longest and slenderest of all; the Teeth *E*, and the Handle *D*.

The Use of the new Ambe.

The Patient, being undressed down to the Waist, is placed in the Arm-Chair, as in TAB. IV. Fig. 1. Next, the Lever, furnished with its Bracer, is raised and kept in an horizontal Position, taking great Care, as *Hippocrates* recommends, to push this Bracer as far as may be under the Arm-pit to the End of the Bone of the Arm, and even beyond, if possible, to the end that the *Humerus*, supported by the Bracer in all its Length, may be secure against all the Power of this Machine, and that its Violence may only act upon those Muscles which keep this Bone out of its Place.

Besides

Besides the Quilting, which the Bracer is lined with, a small Cushion is put upon its Extremity, in order to lodge still more conveniently the Head and the Neck of the *Humerus*, and to preserve the soft Parts from any Contusion, which the Impulse of the Machine might produce, by its greatest Forces acting upon that Part.

The Arm being thus placed and well stretched out upon the Bracer, you tie about it Two Sliding-knots, one above the Elbow, and the other over the Wrist, after having guarded those Parts with a very thick and soft Compress; the Two Sliding-knots are fastened to the Fork of the elastic Tail of the Bracer; after which you complete the fixing of the Arm with the Three Girts of the Bracer, under which are also put Compresses like those just mentioned.

The Arm being thus well adjusted, you endeavour to give to the Body and to the Hollow of the Articulation of the luxated Bone the proper Situation and Steadiness necessary for the Success of the Operation, which is easily executed with this Machine, by the Girts of the Bodice, of which the horizontal one keeps the Patient's Breast closely applied against this Piece, and the vertical Girt retains the *Scapula*, the *Clavicula*, in short, all the Parts where the Bone is to be pushed back, in a Situation proper for receiving it, and for not deviating by yielding to the Efforts of the Machine.

Every thing being thus disposed, the Surgeon places himself behind the Patient, mounted upon something that raises him high enough to inspect the Effects of the Process; to examine by the Touch where it operates; in short, to conduct the Whole by Feeling and
by

by the Eye. The Surgeon being placed, the Assistant who is to conduct the Extremity of the Lever, works it according to his Directions, but perfectly slowly, that the Extensions may be made with less Pain, and more effectually.

If the Luxation is below, it is sufficient for its Reduction to lower the Extremity of the Lever, as is done with the *Ambe* of *Hippocrates*. But here appears a great Difference between the working or playing of these Two Sorts of Levers. The *Ambe* of *Hippocrates* is a plain Lever *A, B*, Fig. 2. TAB. IV. the Motion of which is from *A* to *a*, and consequently has for its Extension only the Space *C, a*, when it is brought to its last Term of becoming perpendicular, *a, b*, whilst it has all *A, C*, or *1, a*, for its Elevation. The *Ambe* of *Hippocrates* therefore almost only raises the Bone of the Arm, without scarcely stretching it; and this is the Defect, which M. *Petit* with Reason blames it for; and which is still more sensible, if one takes the Action of the Lever in *D*, the Point whereabouts it must meet the Edge of the Cavity, and may cause those Mischiefs that are apprehended from it; but instead of placing the fixed Point of that Lever in *1*, lower it to *2*, by the means of the Tenant *1, 2*; then the Direction of the End of the Lever becomes *A, E*; its Elevation is but *1, b*; and the Extension it produces is *A, E*, or *D, E*: If you lower still the Lever's Point of Rest, as in *3*, by a longer Spur, the Elevation of its Extremity is reduced to *1, k*; and the Extension it produces, reaches from *A* to *F*, if one carries those Levers as far as they will go, which is never necessary. In short, it will be in your Power to give to this Lever an Extension as great
as

as you please, joined to a very small Elevation : To this End you need only set backwarder the Lever's Point of Rest, along the Perpendicular marked in Fig. 2. TAB. IV. Now this is precisely what the Spur does, which we have added to our *Ambe*; the Holes it is pierced with, as well as the Mortise of the Foot, are placed in different Degrees, as the Points 1, 2, 3 ; and these Holes, as has been said, are the Places of the Pin which forms the Lever's Hinge or Point of Rest.

The Gradation of those Holes therefore enables you to augment at Will *the Extension*, whilst the Elevation diminishes in the same Proportion ; but if you have a mind the Elevation should diminish more or less than in the foresaid Proportion, for Instance, you want to make a great Extension, and a very small Elevation, there is nothing easier for it than our Machine. You need only push the Spur 1, 3, which is moveable, as you know, towards the End of the Lever to *L*, and stop it there : Then the End of the Lever *A, L*, being very short, it has but little room to play ; on the contrary, if you will have a great Elevation, you need only bring back the said Spur to *M*, or 1, or still farther ; the farther you remove from the End of the Lever, the more it will have room to play, and the more considerable will be its Elevation. It is true, the Power of the Lever will decrease in the same Proportion ; but this Power is so great, that Losses like this ought to be reckoned for nothing.

You have it therefore in your Power with this sort of *Ambe* to make, as Occasion requires, such Extensions and Counter-extensions as you please ; and you may likewise vary all the Degrees of the Elevation, which shall be necessary to give to the Bone that is

to be reduced ; and these are the Perfections which have been hitherto required in this Machine.

Commonly, when the Bone of the Arm is sufficiently stretched and raised, so as to be on a Level with the Cavity of the Articulation, those Bones replace themselves as it were of themselves, because this Level is not always exact ; on the contrary, the Extension and Counter-extension being never regular enough to hinder the *Scapula*, which is a moveable Part, from following a little the Head of the Bone, or its Extension, it happens almost always, that this Head bears pretty strongly against the Edge of the Cavity, and consequently does not fail to fall into the said Cavity, as soon as it has only passed its Edge, and even before it has met the Level, or the Axis of the Hollow of the Articulation ; but it is otherwise after an Extension, a Counter-extension, and an Elevation so regular as those which may be performed by our Machine ; it may happen, that after the Three preceding Operations, the Head of the Bone, without having touched the Edge of the Cavity, will be placed over-against this Cavity, and upon a Level with its Axis, without being able to enter into it, by reason of the Firmness and Exactness of the Powers for retaining the opposite Parts in this State of regular Extension ; and, in this Case, there will remain for you, in order to finish the Operation, to conduct the Head of the Bone into its Cavity, or to let it go into it : But what will you do then ? If you slacken the Extremity of the Lever, or if you lift the same up, you will bring the Head back to the same Place where you took it up ; that is to say, you will bring the Luxation to its former State. If you resolve to relax

relax the running Knots, the Operation will be long, and your Patient will have time enough to cry out.

In order to avoid these Inconvenients, I mounted the Bracer on the Lever in a Groove, and I stopped it in this State by the Teeth of its elastic Tail; by the means of this Construction, when the Surgeon perceives, that the Bone is over-against its Cavity, he directs the Assistant who attends the Extremity of the Lever, to press upon the Handle (TAB. IV. Fig. 1.) *D* of the elastic Tail of the Bracer, to the end that the Teeth placed under the Arch *C*, near the said Handle, may quit their Hold, and that the whole Bracer, which is now no longer stopped, may slide on the Lever towards the Patient, and by this means let the Head of the Bone enter into its Cavity.

The Necessity of this Management with our *Ambe* is a Demonstration, that it is far from having that capital Fault with which M. *Petit* reproaches the *Ambe* of *Hippocrates*: viz. "That it pushes the Head of the Bone into its Cavity, before the Extension and Counter-extension are made." I hope the Machines, whereby I have prevented this Fault, and have procured to my *Ambe* the opposite Perfections, will appear sufficiently simple.

If any body should be apprehensive, that the re-entering of the Head of the Bone might be too sudden, and occasion a Shock that might hurt the said Bones, it will be easy to remedy against it, by substituting to the Stop, into which catch the Teeth of the Bracer, a toothed Wheel *A*, (Fig. 5. TAB. III.) having in its Centre a Handle *B*, *D*; which Handle during the Operation will be stopped by the Piece of Iron *C*, fixed upon this Piece by the Skrew *F*; the said Handle

will also stop the Teeth *E*, which catch into the tooth'd Wheel; and when the Bracer is to be loosened, the Assistant, who holds the Lever with one Hand, will take the Handle with the other, and having got the Skrew *F* taken off, he will remove from the Piece *C*, that stops it, the Part *D*, *B*, of the Handle, by the means of its moveable Arbor *D*, so that the Handle will come at a Right Angle, as it is represented by Dots: Then the Assistant's Hand, sustaining all the Effort of the Handle and of the Bracer, will moderate by the Handle the sliding of the Bracer, and the entering of the Head of the Bone into its Cavity, with all the Slowness he shall think proper for this Operation.

Thus much concerning the Reduction of a Luxation of the Arm below; it is known, that this is the only sort of Luxation in which the *Ambe* of *Hippocrates* can be made use of (the second Defect observed by M. *Petit* in this Machine). I have succeeded in remedying against this Defect by the simplest thing in the World, *viz.* by giving to the Foot that enters into the Arm of the Chair a cylindrical Shape, by which means it is able to turn all manner of ways; so that if the Luxation is forwards, one only needs turn the Extremity of the Lever accordingly, lowering it at the same time enough to make the necessary Extension and Elevation; by this Turn of the Extremity of the Lever forwards, the Head of the Bone is of necessity carried backwards, and replaced into its Cavity. One easily conceives, that one must go to work in the opposite way, when the Luxation is backwards, and so on as for the rest; all according to the Directions of the Surgeon placed at the Articulation, who is to be attentive to examine the State
of

of the Parts, and to order in what Direction and how much is necessary to be done.

III. *The Continuation of An Account of a Treatise of Fluxions, &c.* Book II. by Colin McLaurin, *Prof. Mathem.* Edinburgh. F. R. S. *

Presented March
10. 1742-3.

IN the first Book, the Author described the Method of Fluxions, and its Application to Problems of different Kinds, without making use of any particular Signs or Characters, by geometrical Demonstrations, that its Evidence might appear in the most simple and plain Form. In the second Book, he treats of the Method of Computation, or the Algebraic Part; to the Facility, Conciseness, and great Extent of which, the Improvements that have been made by this Method are in great measure to be ascribed. In order to obtain those Advantages, it was necessary to admit various Symbols into the Algebra: But the Number and Complication of those Signs must occasion some Obscurity in this Art, unless Care be taken to define their Use and Import clearly, with the Nature of the several Operations. An Example of this is given by an Illustration of one of the first Rules in Algebra. As it is the Nature of Quantity to be capable of Augmentation and Diminution, so Addition and Subtraction are the primary Operations in the Sciences that treat of it. The positive Sign implies an Incre-

* See the Beginning of this Account, N^o 468. p. 325.

ment,